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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 10/047,498 | 10/23/2001 | Chien-Ping Huang | 56598 (71987) | 3954 |
| 21874 | 7590 | 12/09/2003 | EXAMINER | |
| EDWARDS & ANGELL, LLP P.O. BOX 9169 BOSTON, MA 02209 | | | NGUYEN, DILINH P | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2814 | |
| DATE MAILED: 12/09/2003 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/047,498 | HUANG, CHIEN-PING | |
| | Examiner | Art Unit | |
| | DiLinh Nguyen | 2814 | |

-- The MAILING DATE of this communication app ars on the cov r sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 17 October 2003.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-7 and 9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-7 and 9 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Tao et al. (U.S. Pat. 6191360).

AAPA discloses a semiconductor package (figs. 9-10) comprising:

a substrate 10 having a first side for disposing a plurality of conductive traces thereon, and a second side for forming a plurality of electrical connection terminals 102 thereon;

at least one chip 11 attached to the first side of the substrate and electrically connected to the conductive traces;

at least one passive device 12 attached to the first side of the substrate and electrically connected to the conductive traces;

an encapsulant formed by a molding compound (fig. 10) for encapsulating the chip, the passive device and the substrate, wherein the second side of the substrate is exposed to outside of the encapsulant.

AAPA fails to disclose a flash proof device attached to the first side of the substrate.

Tao et al. disclose a semiconductor device (figs. 3, 6-7, column 2, lines 62 et seq.) comprising:

a heat spreader 34 attached to the first side of the substrate 30 and formed with a cavity for receiving the chip 33, wherein a distance in elevation from a top side of the heat spreader to the first side of the substrate is made to be slightly greater than a depth of a molding cavity of a mold;

an encapsulant 38 for encapsulating the chip and the heat spreader;

wherein by the elevation to depth arrangement of the heat spreader device and the molding cavity, the top side of the device is exposed to outside of the encapsulant, and the second side of the substrate is free of flash of the molding compound.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of AAPA to improve the heat dissipation for the semiconductor device, as shown by Tao et al.

- Regarding claim 3, Tao et al. disclose the heat spreader is attached to the substrate 30 by a thermally conductive adhesive (column 3, lines 60-61, column 4, lines 17-18).
- Regarding claim 4, Tao et al. disclose the heat spreader is formed with a plurality of vias A, which allow the molding compound used for forming the encapsulant to flow therethrough (fig. 3, column 3, lines 8-10).
- Regarding claim 6, Tao et al. disclose the heat spreader has an outer sidewall thereof adjacent to a side edge of the substrate.

Art Unit: 2814

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Tao et al. (U.S. Pat. 6191360) and further in view of Spaeth (U.S. Pat. 5812570).

AAPA and Tao et al. fail to disclose the device is attached to the substrate by an elastic adhesive.

Spaeth discloses a semiconductor device comprising a dissipator 7 and an elastic adhesive 39 (column 5, lines 13-15 and 37-40). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of AAPA and Tao to provide a good thermal conductivity for the package device, as shown by Spaeth.

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Tao et al. (U.S. Pat. 6191360) and further in view of Mehr (U.S. Pat. 5530295).

AAPA and Tao et al. fail to disclose a plurality of step like recesses are formed on edges of the top side of the heat spreader.

Mehr discloses a heat sink 22 has a plurality of step-like recesses are formed on edges of the top side of the heat sink (fig. 2). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of AAPA and Tao et al. prevent detachment from the package and insure that moisture does not enter the die cavity, as shown by Mehr.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Tao et al. (U.S. Pat. 6191360) and further in view of Shishido et al. (U.S. Pat. 6294831).

AAPA and Tao et al. disclose the claimed invention but not specifically point out that the heat spreader has an outer sidewall thereof aligned with a side edge of the substrate.

Shishido et al. disclose a structure 18 has an outer sidewall thereof aligned with a side edge of the substrate 12 (fig. 1, column 2, lines 61-65) to improve the reliability of the structure to the substrate. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of AAPA and Tao et al. to improve the reliability of the structure to the substrate, as shown by Shishido.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Tao et al. (U.S. Pat. 6191360) and further in view of Petty et al. (U.S. Pat. 6392900).

AAPA and Tao et al. disclose the claimed invention but not specifically point out that a plurality of ground traces, for attaching the heat spreader to the ground traces by using an electrically conductive adhesive.

Petty et al. disclose each block member 60 is secured to the ground trace 53 via solder; however, electrically conductive adhesive may also be utilized (fig. 3A, column 4, lines 11-16) to provide an RF shielding apparatus for shielding electronic components and circuitry mounted to a PCB. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of AAPA and Tao et al. to provide an RF shielding apparatus for shielding electronic components and circuitry mounted to a PCB, as shown by Petty et al.

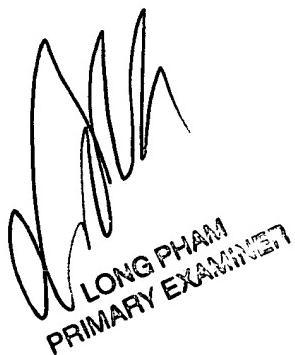
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

DLN
December 3, 2003



A handwritten signature in black ink, appearing to read "LONG PHAM". Below the signature, the words "PRIMARY EXAMINER" are written in a smaller, printed-style font.